SHUAI ZHOU

Senior Undergraduate Student

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RESEARCH INTERESTS

Motion Planning, Multi-Agent/Robot Systems, Heuristic Search

EDUCATION

SOUTH CHINA UNIVERSITY OF TECHNOLOGY Sep 2022 — Jun 2026 (Expected)
Bachelor of Engineering in Robotics, Guangzhou, China *Cumulative GPA: 3.86/4.00, Rank: 4/56*

UNIVERSITY OF CALIFORNIA, BERKELEY Aug 2023 — Dec 2023
Exchange Student, Berkeley, United States *Cumulative GPA: 4.00/4.00*

PUBLICATIONS

*** denotes equal contribution**

Bridging Planning and Execution: Multi-Agent Path Finding Under Real World Deadlines
Jingtian Yan*, **Shuai Zhou***, Stephen Smith, Jiaoyang Li — **Under Review**

- Main Contributions: Proposed REMAP, a general MAPF planning framework that bridges the gap between planning and real-world execution by incorporating a learned execution-time predictor (ExecTimeNet). Demonstrated its integration with MAPF-LNS and CBS to solve the novel MAPF with Real-world Deadlines (MAPF-RD) problem, achieving up to 20% improvement in solution quality in realistic simulations.

LSRP*: Scalable and Anytime Planning for Multi-Agent Path Finding with Asynchronous Actions
Shuai Zhou, Shizhe Zhao, Zhongqiang Ren — **Under Review (Journal Version)**
Extended Abstract Doi: socs.v18i1.36016 — **In SoCS 2025**

- Main Contributions: This paper extends the previously proposed LSRP algorithm to an anytime version and is the first method capable of finding optimal solutions for Multi-Agent Path Finding with Asynchronous Actions (MAPF-AA). Given a reasonable amount of computation time, the proposed approach can efficiently handle instances with up to 1,000 agents, achieve near-optimal solutions, and eventually converge to the optimal one. This approach serves as a search framework that can easily incorporate other planners as shortcuts while retaining guarantees of eventual optimality.

Loosely Synchronized Rule-Based Planning for Multi-Agent Path Finding with Asynchronous Actions
Shuai Zhou, Shizhe Zhao, Zhongqiang Ren — **In AAAI 2025**
Paper Doi: aaai.v39i14.33618 | Code: public_LSRP

- Main Contributions: This paper proposes a novel approach to Multi-Agent Path Finding with Asynchronous Actions, focusing on scalability over optimality. By integrating search-based (LSS) and rule-based (PIBT) planning, the proposed approach efficiently computes unbounded sub-optimal solutions for large-scale problems. Experiments demonstrate its ability to handle 10× more agents than baselines with only 25% longer makespan.

RESEARCH EXPERIENCE

CARNEGIE MELLON UNIVERSITY, ARCS Lab Apr 2025 — Present
Research Intern, Pittsburgh, United States *Supervised by Prof Jiaoyang Li*

- Co-lead research on an Multi-Agent Path Finding (MAPF) with real-world deadlines.
- Combine deadline-aware heuristics with learning-based execution models to adapt MAPF to real-world scenarios.
- Design, implement (C++), and evaluate planning algorithms in both simulation and on physical mobile robots.
- One Co-first-author paper submitted to **AAAI 2026**

UNIVERSITY OF CALIFORNIA, IRVINE, IDM Lab Mar 2025 — Jul 2025
Collaboration via RAP Lab, Irvine, United States *Supervised by Prof Sven Koenig*

- Lead research on an anytime planner for Multi-Agent Path Finding with Asynchronous Actions (MAPF-AA).
- Enhance large neighborhood search with congestion-aware heuristics to improve solution refinement.
- Design, implement (C++), and evaluate algorithms in grid-based simulation;

SHANGHAI JIAO TONG UNIVERSITY, RAP Lab Apr 2024 — Present
Research Intern, Shanghai, China *Supervised by Prof Zhongqiang Ren*

- Led research on a scalable planner for Multi-Agent Path Finding with Asynchronous Actions (MAPF-AA).

- Planned for 1,000 robots using rule-based strategies and extended to a general search framework with provable optimality.
- Designed, implemented (C++), and evaluated algorithms in grid-based simulation; analyzed theoretical properties such as completeness; led the writing of the research paper.
- One first-author paper accepted by **AAAI 2025** and one extended abstract accepted by **SoCS 2025**.

SERVICE

Reviewer: IROS 2025

SKILLS

- **OS**: Windows, Linux(Ubuntu)
- **Programming Languages**: Python, C/C++, Java, HTML,MATLAB
- **Languages**: Chinese (native), English (fluent)
- **Additional Courses**
  - CMU: 10301/601 Introduction to Machine Learning
  - CMU: 16-782 Planning and Decision-making in Robotics
  - Coursera: Robotics: Computational Motion Planning
  - Coursera: Robotics: Aerial Robotics

AWARDS

Outstanding Visiting Student Scholarship from USIEA Guangzhou, China
Awarded to the top student in the UC Berkeley Global program; received 6,000 CNY Mar 2024

Merit Student of South China University of Technology Guangzhou, China
Top student in the Robotics Engineering major, Class of 2022 Feb 2024

The Third Prize Scholarship by South China University of Technology Guangzhou, China
Top 10% of students, receiving 10,000 CNY Dec 2023

Exchange Student Scholarship from South China University of Technology Guangzhou, China
Awarded to outstanding students for overseas exchange, receiving 40,000 CNY Jul 2023

REFERENCES

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Prof. Sven Koenig
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Department: Donald Bren School of Information and Computer Science

Prof. Zhongqiang Ren
Assistant Professor, Shanghai Jiao Tong University
E-mail: zhongqiang.ren@sjtu.edu.cn
Department: University of Michigan - Shanghai Jiao Tong University Joint Institute, Automation

Dr. Shizhe Zhao
Postdoctoral, Shanghai Jiao Tong University
E-mail: shizhe.zhao@sjtu.edu.cn
Department: University of Michigan - Shanghai Jiao Tong University Joint Institute

Jingtian Yan
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